REMARKS

Applicants confirm the election without traverse of the invention of claims 1-9 for prosecution in the present application. Claims 10-29, which are directed to non-elected inventions, are canceled.

The Abstract is being replaced to better reflect the scope of the claims remaining in the application. No new matter is added.

Pursuant to 37 C.F.R. 1.48(b), the cancellation of claims 10-29 necessitates a correction of inventorship in the present application. Accordingly, an accompanying request to correct inventorship is being submitted to delete Mark T. Sullivan and David H. Kittell as inventors.

Claims 1-29 were pending in the above-identified application when last examined and are amended as indicated above. The claim amendments clarify the claim language and are not intended to limit the scope of the claims, unless the claim language is expressly quoted in the following remarks to distinguish over the art cited.

Claims 4 and 5 were objected to because of informalities. In particular, the Examiner indicated that claims 4 and 5 were unclear regarding whether the beam splitter of claim 5 refers to the "optical element" of claim 4, the beam splitter of claim 1, or a different beam splitter. In response, claims 4 and 5 are amended to clarify that "the beam splitter" in claim 5 refers to the beam splitter introduced in claim 1.

Claims 1-6 were rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 4,912,530 (Bessho). Applicants respectfully traverse the rejection.

Amended claim 1 distinguishes over Bessho at least by reciting, "a heterodyne beam that includes a first frequency component having a first frequency and a first linear polarization and a second frequency component having a second frequency and a second linear polarization... ; a beam splitter positioned to separate the first and second frequency components of the heterodyne beam and thereby produce a first beam having the first frequency and a second beam having the second frequency; a first AOM in a path of the first beam, the first AOM operating to increase a difference between the frequencies of the first and second beams." Bessho fails to disclose or suggest an AOM that operates on a separated frequency component of a heterodyne beam.

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Fig. 1 of Bessho shows a system including a frequency shifter 20. Frequency shifter 20 receives an input beam from a Zeeman laser source 10 via a non-polarizing beam splitter 12, a polarizer 14, a quarter-wave plate 16, and a mirror 18. More specifically, Bessho starting at column 4, line 1 states, "A component of each of the two linearly polarized laser beams produced by the laser source 10 is reflected by the non-polarizing beam splitter 12... The laser beams reflected by the beam splitter 12 is [sic] transmitted through a polarizer 14 and a 1/4 waveplate 16, whereby the two linearly polarized laser beams reflected by the beam splitter 12 are converted into a circularly polarized laser beam. This circularly polarized beam is reflected by a mirror 18 and is thereby incident upon a frequency shifter 20." Bessho starting at column 4, line 12 describes the frequency shifter 20 as containing "a polarizing beam splitter 22 for splitting the circularly polarized laser beam from the mirror 18 into two linearly polarized laser beams, a pair of acoustooptical modulators 24, 26 which are adapted to diffract the respective linearly polarized laser beams from the beam splitter 22 and change the frequencies of the received laser beams, and a polarizing beam splitter 28 which combine [sic] the laser beams from the acoustooptical modulators 24, 26."

Bessho fails to suggest separating frequency components of a heterodyne beam and then applying an AOM to a separated beam. In particular, Bessho describes that beam splitter 22 operates on a circularly-polarized input beam and fails to indicate that the separated linearly polarized beams correspond to the frequency components of the input beam. Bessho describes that the frequency difference or beat frequency fHB of beam B1 is larger than the frequency difference of beat frequency fLB of beam B2. If beat frequency fHB is large enough compared to beat frequency fLB, the frequency shifts from AOMs 24 and 26 dominate. However, using AOMs 24 and 26 of Bessho on heterodyne beams can multiply the number of frequencies, creating a number of beat frequencies that differ by the original frequency difference fLB. In contrast, separating the frequency components as recited in claim 1 allows an AOM to build on the existing frequency difference without increasing the number of different frequencies in the resulting beams. Claim 1 is thus patentable over Bessho.

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Claims 2-6, which depend from claim 1, are patentable over Bessho for at least the same reasons that claim 1 is patentable over Bessho.

For the above reasons, Applicants request reconsideration and withdrawal of the rejection under 35 U.S.C. § 102.

Claims 7-9 were rejected under 35 U.S.C. § 103(a) as unpatentable over Bessho in

view of U.S. Patent No. 5,438,412 (Tenjinbayashi) and U.S. Patent No. 6,215,118 (Heffner). Applicants respectfully traverse the rejection.

Claim 7 distinguishes over the combination of Bessho, Tenjinbayashi, and Heffner at least by reciting, "a beam-combining unit positioned to receive the first and second beams and provide a recombined heterodyne beam to the interferometer optics, wherein the beam combining unit comprises: a beam combiner; a first optic cable assembly that carries the first beam; a second optic cable assembly that carries the second beam to the beam combiner; and a first manipulator on which the first fiber optic cable assembly is mounted, the first manipulator being adjustable to control a direction of the first beam upon exit from the first fiber optic cable assembly, wherein adjustment of the first manipulator controls an incident angle of the first beam on the beam combiner."

The combination of Bessho, Tenjinbayashi, and Heffner fails to suggest an interferometer in which first and second optic cable assemblies carry beams that are recombined to form a heterodyne beam for the interferometer optics. As the Examiner noted, Bessho does not show the use of optical fibers and manipulators. Tenjinbayashi in Fig. 1 shows use of an optical fiber 42 in an interferometer but not in a system in which beams from separate optical fibers are recombined. More specifically, Tenjinbayashi is silent with regard to how beams from separate optical fibers could be adequately aligned to form a recombined heterodyne beam suitable for interferometer optics. Heffner describes an alignment and autofocus system but fails to mention either interferometers or recombining beams. Accordingly, the combination of Bessho, Tenjinbayashi, and Heffner fails to suggest modification of Bessho to use first and second optical cable assemblies because the combination fails to suggest use of optical fibers for beams that must be recombined and fails to suggest that adequate precision could be achieved for use in an interferometer. Claim 7 is thus patentable over the combination of Bessho, Tenjinbayashi, and Heffner.

Claims 8 and 9 depend from claim 7 and are patentable over Bessho, Tenjinbayashi, and Heffner for at least the same reasons that claim 7 is patentable over Bessho, Tenjinbayashi, and Heffner.

For the above reasons, Applicants request reconsideration and withdrawal of the rejection under 35 U.S.C. § 103.

New claims 30-33 depend from claim 7 and are also patentable for at least the same reasons that claim 7 is patentable.

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In summary, claims 1-29 were pending in the application. This response amends claims 1, 3-5, 7, and 8, cancels non-elected claims 10-29, and adds claims 30-33. For the above reasons, Applicants respectfully request allowance of the application including claims 1-9 and 30-33.

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Respectfully submitted,

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